No. 9000040

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Iowa Agriculture and Home Economics Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS REQUIRED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'Marcus'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 31st *day of* March *in the year of our Lord one thousand nine hundred and* ninety-two.

Attest:

Kenneth B. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Edward Madigan

Secretary of Agriculture

APPROVAL EXPIRES 2-28-88

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)
Iowa Agriculture and Home Economics Experiment Station

2. TEMPORARY DESIGNATION
A85-193023

3. VARIETY NAME
Marcus

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*
104 Curtiss
Iowa State University
Ames, IA 50011

5. PHONE *(Include area code)*
515-294-4762

FOR OFFICIAL USE ONLY

PVPO NUMBER
9000040

6. GENUS AND SPECIES NAME
Glycine max

7. FAMILY NAME *(Botanical)*
Leguminosae

FILING
DATE: Jan. 9, 1990
TIME: 9:45 ☑ A.M. ☐ P.M.

8. KIND NAME
Soybean

9. DATE OF DETERMINATION
August 15, 1989

FEES RECEIVED
AMOUNT FOR FILING
$1800.00 + 350.00
DATE
Dec. 4, 1989 Dec. 11, 1989

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Iowa ~~State~~ Agriculture & Home Economics Experiment Station

AMOUNT FOR CERTIFICATE
$250.00
DATE
March 16, 1992

11. IF INCORPORATED, GIVE STATE OF INCORPORATION

12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

PHONE *(Include area code)*:

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. ☐ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* ☒ Yes *(If "Yes," answer items 16 and 17 below)* ☐ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ Yes ☐ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ Foundation ☒ Registered ☒ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ Yes *(If "Yes," give date)*
☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
The variety was formally released on August 15, 1989. Sale of seed to commercial seed growers will not occur until 1990 in the United States. The variety was not released in any other country.
☒ Yes *(If "Yes," give names of countries and dates)*
☐ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT
Walter G. Hehr
DATE
Nov. 13, 1989

SIGNATURE OF APPLICANT
Thomas G. Isely
DATE
11-27-89

FORM LS-470 (3-86) *Edition of 7-84 obsolete.*

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Exhibit A

Development of the Cultivar 'Marcus' by the Multiple-seed Procedure of Single-seed Descent

Year	Activity
May 1982	The cross of A79-135010 X Asgrow 'A1937' was made at Iowa State Univeresity, Ames, IA. The population was designated AX2804.
Oct. 1982	F_1 plants of AX2804 were grown in the field at the Iowa State University-University of Puerto Rico nursery at Isabela Puerto Rico, to obtain F_2 seeds.
Feb. 1983	F_2 plants of AX2804 were grown in Puerto Rico, under natural day length conditions. Three F_3 seeds from each plant in the population AX2804 were bulked.
May 1983	F_3 plants of AX2804 were grown in the field at Ames. F_3 plants were classified as early, mid-season, or late maturity and were threshed individually.
May 1984	$F_{3:4}$ lines of AX2804 were evaluated in two replications of single-hill plots spaced 1 by 1 m at each of two Iowa locations. About 50% of the lines with the best visual agronomic characteristics were harvested for seed yield.
May 1985	Selected $F_{3:5}$ lines of AX2804 were grown in two replications of two-row plots at three Iowa locations. The line that became Marcus was designated A85-193023.
May 1986	a. A85-193023 was evaluated for seed yield and other characters in the Uniform Soybean Tests. b. Purification of the line was initiated at Ames. Individual F_6 plants with uniform plant and seed traits were harvested from the line and threshed individually.
May 1987	a. A85-193023 was evaluated in Iowa and other states in the Uniform Soybean Tests. b. Progeny rows from individual plants of A85-193023 were grown at Ames. Progeny rows with uniform characteristics were harvested separately.
May 1988	a. A85-193023 was evaluated in Iowa and other states in the Uniform Soybean Tests. b. Progeny rows harvested in 1987 were used

to plant about 6 acres for breeder seed production. The progeny increases were examined for homogenity during the growing season and the increases with uniform characteristics were harvested together. The seed was distributed to the Iowa foundation seed organization.

May 1989 — The breeder seed was planted in Iowa to obtain foundation seed.

Aug. 15, 1989 — The line was officially released as the cultivar 'Marcus'.

9000040

Iowa Crop Improvement Association

2023 Agronomy Hall Ames, Iowa 50011
Area Code 515-294-6921

Iowa
a place to grow

February 18, 1992

Dr. Jeffrey L. Strachan
Plant Variety Examiner
National Agricultural Library
Rm. 500, 10301 Baltimore Blvd.
Beltsville, Maryland 20705

RE: Soybean Application No. 9000040, MARCUS

Dear Dr. Strachan:

This letter is to verify the stability of MARCUS in support of the application for Plant Variety Protection.

In 1988, breeder seed of MARCUS was produced, and foundation seed was produced in 1989, 1990 and 1991. Field inspection reports completed by the Iowa Crop Improvement Association inspector and seed laboratory reports of each of these four years indicate the following:

YEAR	INSPECTION Field			Seed Lot		
	No.	% off-type	Description	No.	% off-type	Description
1988	1	0.00		81Br	0.00	
1989	19	0.00		91	0.07	Yel hilum
	20	0.00				
	21	0.00				
	22	0.00				
	28	0.00				
1990	21	0.00		01	0.00	
1991	20	0.00		10	0.00	

The above data indicates the variety is stable and uniform.

Sincerely,

Robert E Lawson

Robert E. Lawson
Secretary-Treasurer

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Exhibit B, Novelty Statement

Marcus is most similar to 'Hardin'. The two varieties are similar in the following traits:

Seed protein and oil content
Susceptibility to Fe-deficiency chlorosis on calcareous soil
Shattering resistance
Seed coat luster

Marcus differs from Hardin in the following traits:

Marcus	Hardin
White flowers	Purple flowers
Tawny pubescence	Grey pubescence
Tan pods at maturity	Brown pods at maturity
Brown hila	Yellow hila

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
SOYBEAN (Glycine max L.)

NAME OF APPLICANT(S)	TEMPORARY DESIGNATION	VARIETY NAME
Iowa Agriculture and Home Economics Experiment Station	A85-193023	Marcus

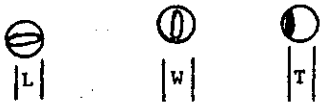
ADDRESS *(Street and No., or R.F.D. No., City, State, and Zip Code)*
104 Curtiss
Iowa State University
Ames, IA 50011

FOR OFFICIAL USE ONLY
PVPO NUMBER
9000040

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g., [0][9]). Starred characters ★ are considered fundamental to an adequate soybean variety description. Other characters should be described when information is available.

1. SEED SHAPE:

[1]



1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)
2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)
4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

★ **2. SEED COAT COLOR: (Mature Seed)**

[1] 1 = Yellow 2 = Green 3 = Brown 4 = Black 5 = Other *(Specify)* _____

3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

[1] 1 = Dull ('Corsoy 79'; 'Braxton') 2 = Shiny ('Nebsoy'; 'Gasoy 17')

★ **4. SEED SIZE: (Mature Seed)**

[1][5] Grams per 100 seeds

★ **5. HILUM COLOR: (Mature Seed)**

[3] 1 = Buff 2 = Yellow 3 = Brown 4 = Gray 5 = Imperfect Black 6 = Black 7 = Other *(Specify)* _____

★ **6. COTYLEDON COLOR: (Mature Seed)**

[1] 1 = Yellow 2 = Green

★ **7. SEED PROTEIN PEROXIDASE ACTIVITY:**

[ ] 1 = Low 2 = High

★ **8. SEED PROTEIN ELECTROPHORETIC BAND:**

[ ] 1 = Type A ($SP1^a$) 2 = Type B ($SP1^b$)

★ **9. HYPOCOTYL COLOR:**

[ ] 1 = Green only ('Evans'; 'Davis') 2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')
3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')
4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

★ **10. LEAFLET SHAPE:**

[3] 1 = Lanceolate 2 = Oval 3 = Ovate 4 = Other *(Specify)* _____

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11. LEAFLET SIZE:

[2] 1 = Small ('Amsoy 71'; 'A5312') 2 = Medium ('Corsoy 79'; 'Gasoy 17') 3 = Large ('Crawford'; 'Tracy')

12. LEAF COLOR:

[2] 1 = Light Green ('Weber'; 'York') 2 = Medium Green ('Corsoy 79'; 'Braxton') 3 = Dark Green ('Gnome'; 'Tracy')

★ **13. FLOWER COLOR:**

[1] 1 = White 2 = Purple 3 = White with purple throat

★ **14. POD COLOR:**

[2] 1 = Tan 2 = Brown 3 = Black

★ **15. PLANT PUBESCENCE COLOR:**

[2] 1 = Gray 2 = Brown (Tawny)

16. PLANT TYPES:

[2] 1 = Slender ('Essex'; 'Amsoy 71') 2 = Intermediate ('Amcor'; 'Braxton') 3 = Bushy ('Gnome'; 'Govan')

★ **17. PLANT HABIT:**

[3] 1 = Determinate ('Gnome'; 'Braxton') 2 = Semi-Determinate ('Will') 3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

★ **18. MATURITY GROUP:**

[0][4] 1 = 000 2 = 00 3 = 0 4 = I 5 = II 6 = III 7 = IV 8 = V 9 = VI 10 = VII 11 = VIII 12 = IX 13 = X

★ **19. DISEASE REACTION:** (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

★ [0] Bacterial Pustule (*Xanthomonas phaseoli* var. *sojensis*)

★ [0] Bacterial Blight (*Pseudomonas glycinea*)

★ [0] Wildfire (*Pseudomonas tabaci*)

FUNGAL DISEASES:

★ [0] Brown Spot (*Septoria glycines*)

Frogeye Leaf Spot (*Cercospora sojina*)

★ [0] Race 1 [0] Race 2 [0] Race 3 [0] Race 4 [0] Race 5 [ ] Other (Specify)

[0] Target Spot (*Corynespora cassiicola*)

[0] Downy Mildew (*Peronospora trifoliorum* var. *manshurica*)

[0] Powdery Mildew (*Microsphaera diffusa*)

★ [1] Brown Stem Rot (*Cephalosporium gregatum*)

[0] Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

FUNGAL DISEASES: (Continued)

★ [1] Pod and Stem Blight *(Diaporthe phaseolorum* var; *sojae)*

[1] Purple Seed Stain *(Cercospora kikuchii)*

[0] Rhizoctonia Root Rot *(Rhizoctonia solani)*

Phytophthora Rot *(Phytophthora megasperma* var. *sojae)*

★ [1] Race 1 [0] Race 2 [0] Race 3 [1] Race 4 [0] Race 5 [0] Race 6 [1] Race 7

[0] Race 8 [0] Race 9 [ ] Other *(Specify)* _____

VIRAL DISEASES:

[0] Bud Blight (Tobacco Ringspot Virus)

[0] Yellow Mosaic (Bean Yellow Mosaic Virus)

★ [0] Cowpea Mosaic (Cowpea Chlorotic Virus)

[0] Pod Mottle (Bean Pod Mottle Virus)

★ [1] Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

Soybean Cyst Nematode *(Heterodera glycines)*

★ [0] Race 1 [0] Race 2 [0] Race 3 [0] Race 4 [0] Other *(Specify)* _____

[0] Lance Nematode *(Hoplolaimus Colombus)*

★ [0] Southern Root Knot Nematode *(Meloidogyne incognita)*

★ [0] Northern Root Knot Nematode *(Meloidogyne Hapla)*

[0] Peanut Root Knot Nematode *(Meloidogyne arenaria)*

[0] Reniform Nematode *(Rotylenchulus reniformis)*

[0] OTHER DISEASE NOT ON FORM *(Specify):* _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

★ [1] Iron Chlorosis on Calcareous Soil

[ ] Other *(Specify)* _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

[0] Mexican Bean Beetle *(Epilachna varivestis)*

[0] Potato Leaf Hopper *(Empoasca fabae)*

[ ] Other *(Specify)* _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	Hardin	Seed Coat Luster	Hardin
Leaf Shape	Hardin	Seed Size	Hardin
Leaf Color	Hardin	Seed Shape	Hardin
Leaf Size	Hardin	Seedling Pigmentation	Elgin 87

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/ POD
				CM Width	CM Length	% Protein	% Oil		
Submitted Marcus	128	1.8	81	8	12	39.8	21.5	15.6	3
Hardin Name of Similar Variety	125	2.2	94	7	9	39.6	21.6	14.4	3

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTI-A_2 in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

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Exhibit E, Statement of the Basis of Applicant's Ownership

Marcus was developed and is owned by the Iowa Agriculture and Home Ecomomics Experiment Station, Ames, Iowa.